

810 ELECTRIC POWER

The electric power demand of a Navy or Marine Corps installation will normally be predicated upon an engineering study of personnel and industrial-type consumption load of the installation activities. (See Electrical Engineering, NAVFAC DM-4 for criteria for determining specific electrical requirements common to structures in this category group.) However, in the absence of an engineering study the following should be utilized for broad planning purposes:

Electric Demand Planning Factors

<u>Cat. Group</u>	<u>Description</u>	<u>Unit of Measure (UM)</u>	<u>Maximum Demand Per Unit of Measure (Watts)</u>
130	Communication & Navigational Aid	SF	13,5
	Airfield Lighting	LF	6
140	Land Operational Facilities	SF	7.5
150	Waterfront Operational Facilities	SF	5
		FB	5 x 10 ³
170	Training Facilities	SF	7.5
210	Maint. Shops & Facilities	SF	7.5
220	Production Bldgs. & Plants	SF	7.5
310	Research, Development & Test Bldg.	SF	7.5
440	Storage, Covered	SF	2
510/20	Hospital Buildings	SF	6
		BD	4 x 10 ³
530/40/50	Labs, Clinics, Dispensaries	SF	8
610	Administration Buildings	SF	6
710	Family Housing	SF	4.5*
		FA	6 X 10 ³ *
720	Troop Housing	SF	5.5
		MN	500
730/40	Community Facilities	SF	7
821	Heating Plants	SF	5
		MBH	3 x 10 ³
830	Sewage Treatment Plants	MGPD	200 x 10 ³

*Coincident demand for multiple units.

For definitive drawings of electric power plants and steam electric generator plants, see Definitive Designs, NAVFAC P-272, Part 2.

811 ELECTRIC POWER-SOURCE

Electric power for base facilities operation is normally derived from local commercial sources. Where commercial sources are used, transformer substations are required to transform the electrical energy to satisfy the station's load requirement. Where commercial electricity is not available, power plants will be planned. Standby generator plants are planned to provide adequate uninterrupted power supply in emergencies. Planning for power plants will include the building, the power generating equipment, and supporting appurtenances such as fuel storage for plant operation, auxiliary power, and switching stations. Power plants will be listed by code in accordance with the type fuel used as follows (except 811 09):

811 09 ELECTRIC POWER PLANT BUILDING (SF)

811 10 ELECTRIC POWER PLANT - DIESEL (KW)

811 25 ELECTRIC POWER PLANT - STEAM (KW)

811 45 ELECTRIC POWER PLANT - GAS TURBINE (KW)

A standby generator plant will be coded separately under Code 811 60.

811 10--811 45 ELECTRIC POWER PLANTS

Consideration as to whether an electric power generating plant is to be planned will depend on the station's geographical location, the availability of a firm uninterrupted adequate power supply from a local electric utility, the economics of using byproduct steam for space heating and industrial process work, and the availability of the required fuel. The electric generating plant (diesel or steam) shall have a total installed capacity equal to the station's total kilowatt demand and in the case of diesel generators there must be one additional standby generating unit with a capacity equal to the largest unit on the line. In the planning and determination of power plant capacity, due consideration should be given to the estimated demand of all of the station's consumption, both domestic and industrial, plus the anticipated load growth. The estimated electrical requirements for most repetitive types of Navy buildings and structures are shown on the definitive drawings in Definitive Designs, NAVFAC P-272. For initial planning purposes, power plant capacity may be computed by either (1) utilizing the factors indicated under 810 above, or (2) totalling all of the estimated demands in kilowatts of all existing and proposed station buildings as shown on the definitive drawings and multiplying this total by an appropriate diversity factor. Where a diversity factor is not provided a factor of eight percent (80%) may be used. The resultant total is the estimated power plant capacity or the estimated amount of electrical power needed by the station facilities. See Definitive Designs, NAVFAC P-272, Part 2, for various types and sizes of electrical power plants. See NAVFAC DM-4, Electrical Engineering for design information.

811 59 STANDBY GENERATOR BUILDING (SF)

811 60 STANDBY GENERATOR PLANT (KW)

Central standby generator plants are desirable and should be planned to provide adequate power in the event of outages of the essential facilities

of the base. Emergency generating units with automatic changeover should be planned for essential loads such as hospital operating rooms, electronic devices (radar, communications, navigation aids), control tower, fire alarm systems, water pumps, certain aviation facilities, sewage plants, and other uses as determined by local operational factors. The standard drawings in Definitive Designs; NAVFAC P-272, give the estimated power demands. The capacity of the standby generator plants is computed from the power demand of the essential activities requiring support during an outage. See NAVFAC DM-4, Electrical Engineering for design information.

812 ELECTRIC POWER - TRANSMISSION AND DISTRIBUTION LINES

Distribution and transmission lines are required to supply electricity to buildings, street lighting, floodlighting, and perimeter lighting. Lines may be either overhead or underground and will include poles, ducts, and controls to distribute electrical energy from the source to each using facility. Planning for distribution and transmission lines will require engineering calculation of critical power demand loads and future load growth. Airfield pavement lighting is planned as described under Code 136 herein.

812 09 ELECTRIC DISTRIBUTION BUILDING/SHELTER (SF) 812 12 TRANSFORMER STATION LESS THAN 500 KV (KV)

A transformer station is an intermediate station between a generating station and the utilization point, in which the electrical power is transformed to another voltage and where the total output of a transformer is through a single protective device.

A transformer station should be located as near the load center as practicable, and be capable of supplying the maximum demand of the area served. See NAVFAC DM-4, Electrical Engineering, for factors and methods of calculating demand and load.

812 20 STREET LIGHTING (LF)

Street lighting is required for both safety and security of station personnel and vehicular movement. A street lighting system consists of transformers, street lighting circuits, light poles or standards, and light assemblies to illuminate vehicular and pedestrian traffic areas. Street lighting systems should be planned for all primary and secondary streets and roads and also for administrative, recreational, medical, piers, and any other areas where pedestrian or vehicular traffic is significant. The number of linear feet (LF) of street lighting and the power demand (KW) will be determined by an engineering survey.

812 30 ELECTRICAL DISTRIBUTION LINES (LF)

Distribution lines are those components of an electrical utility system that connect the power source to the consuming facility. A planned distribution system will supply adequate electrical service to the load area, allow for expansion, and meet acceptable limits of communication and electronic interference. The distribution planning must include such considerations as the type and physical layout of the installation served, the planned load growth, and necessary safety clearances. Overhead distribution lines are usually planned for reasons of economy. Lines are placed underground at air installations in those areas where they are a hazard to aircraft. The distribution system should be flexible so that expansion and changing load conditions can be met with a minimum of modification and expense. Requirements of an area will dictate the type of system that will be necessary, whether it is to be overhead or

underground. Linear feet (LF) of distribution lines required will be determined by an engineering survey.

812 40 PERIMETER/SECURITY LIGHTING (LF)

This utility provides uniform illumination for security purposes and for activities such as aircraft and vehicle servicing or outdoor recreation. The intensity, number, and location of lights will be determined by an engineering survey. To eliminate hazards, pole mounted floodlights should be avoided in the vicinity of airfields and lights mounted on adjacent structures if possible.

This code should be used for reporting pole-mounted floodlighting systems. In cases where lights are mounted on buildings or structures, they should be considered as part of the supporting element.

813 ELECTRIC POWER - SUBSTATIONS AND SWITCHING STATIONS

813 10 SWITCHING/SUBSTATION BUILDING/SHELTER (SF)

813 20 SUBSTATION MORE THAN 499 KV (KV)

A substation at Navy installations is used to transform electrical energy, received from a commercial utility source or from a station power plant, to satisfy the requirements (KW) of the station facilities to be served. The substation facility normally consists of a structure, buses, transformers, switchgear, grounding system, and related protective devices. The capacity of a source substation shall be at least equal to the capacity of the electrical power demand (KW) of the facilities served in each respective load center. The area and activity load on a distribution substation is the product of the connected load times the demand factor and coincident peak demands. See NAVFAC DM-4, Electrical Engineering for methods of calculating demand and load.

813 30 SWITCHING STATION FOR SECTIONALIZED DISTRIBUTION CIRCUITS (KV)

A switching station is an intermediate station between a generating station or substation where electric power is switched without transformation.

Switching stations are located at points where it is necessary to branch off from a main feeder or feeders with smaller components due to physical location of the facilities to be served. See NAVFAC DM-4, Electrical Engineering, for factors and methods of calculating demand and load.